

Docket No. 396.43501X00
Serial No. 10/777,085
July 7, 2006

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. (Currently amended) A cleaning solution for semiconductor substrates, which comprises an oxidizing agent, an acid and a fluorine compound, has a pH adjusted in a range of 3 to 10 by addition of a basic compound and has a concentration of water of 80% by weight or greater, wherein a ratio of an amount by weight of the acid to an amount by weight of the oxidizing agent is in a range of 0.1 to 1,000.
2. (Currently amended) A cleaning solution for semiconductor substrates, which comprises an oxidizing agent, an acid, a fluorine compound and a corrosion inhibitor, has a pH adjusted in a range of 3 to 10 by addition of a basic compound and has a concentration of water of 80% by weight or greater, wherein a ratio of an amount by weight of the acid to an amount by weight of the oxidizing agent is in a range of 0.1 to 1,000.
3. (Cancelled).
4. (Previously presented) A cleaning solution according to Claim 1, wherein the oxidizing agent is hydrogen peroxide.
5. (Previously presented) A cleaning solution according to Claim 1, wherein the oxidizing agent is nitric acid.

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6. (Previously presented) A cleaning solution according to Claim 1, wherein the acid is an inorganic acid.
7. (Previously presented) A cleaning solution according to Claim 6, wherein the inorganic acid is at least one acid selected from a group consisting of boric acid, sulfamic acid, phosphoric acid and carbonic acid.
8. (Previously presented) A cleaning solution according to Claim 6, wherein the inorganic acid is sulfuric acid.
9. (Previously presented) A cleaning solution according to Claim 1, wherein the acid is an organic acid.
10. (Previously presented) A cleaning solution according to Claim 9, wherein the organic acid is at least one acid selected from a group consisting of oxalic acid, citric acid, propionic acid and acetic acid.
11. (Previously presented) A cleaning solution according to Claim 10, wherein the fluorine compound is ammonium fluoride or tetramethylammonium fluoride.
12. (Previously presented) A cleaning solution according to Claim 1, wherein the basic compound is a strong base having no metal ions.

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13. (Previously presented) A cleaning solution according to Claim 12, wherein the strong base having no metal ions is tetramethylammonium hydroxide or trimethylhydroxyethylammonium hydroxide.

14. (Previously presented) A cleaning solution according to Claim 2, wherein the corrosion inhibitor is polyethyleneimine.

15. (Previously presented) A cleaning solution according to Claim 1, which further comprises a surfactant.

16. (Original) A cleaning solution according to Claim 15, wherein the surfactant is an anionic surfactant.

17. (Original) A cleaning solution according to Claim 16, wherein the anionic surfactant is a phosphoric ester of a polyoxyethylenealkyl ether or a phosphoric ester of a polyoxyethylenealkyl aryl ether.

18. (Previously presented) A cleaning solution according to Claim 1, adapted for cleaning semiconductor substrates having metal wiring which comprises copper alone or a laminate structure of copper and a barrier metal.

19. (Previously presented) A process for cleaning semiconductor substrates having metal wiring, which comprises cleaning with a cleaning solution described in Claim 1 .

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20. (Previously presented) A process according to Claim 19, wherein said metal wiring comprises copper alone or a laminate structure of copper and a barrier metal.

21. (Cancelled).

22. (Previously presented) A cleaning solution according to Claim 2, wherein the oxidizing agent is hydrogen peroxide.

23. (Previously presented) A cleaning solution according to Claim 2, wherein the oxidizing agent is nitric acid.

24. (Previously presented) A cleaning solution according to Claim 2, wherein the acid is an inorganic acid.

25. (Previously presented) A cleaning solution according to Claim 24, wherein the inorganic acid is at least one acid selected from a group consisting of boric acid, sulfamic acid, phosphoric acid and carbonic acid.

26. (Previously presented) A cleaning solution according to Claim 24, wherein the inorganic acid is sulfuric acid.

27. (Previously presented) A cleaning solution according to Claim 2, wherein the acid is an organic acid.

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28. (Previously presented) A cleaning solution according to Claim 27, wherein the organic acid is at least one acid selected from a group consisting of oxalic acid, citric acid, propionic acid and acetic acid.

29. (Previously presented) A cleaning solution according to Claim 28, wherein the fluorine compound is ammonium fluoride or tetramethylammonium fluoride.

30. (Previously presented) A cleaning solution according to Claim 2, wherein the fluorine compound is ammonium fluoride or tetramethylammonium fluoride.

31. (Previously presented) A cleaning solution according to Claim 1, wherein the fluorine compound is ammonium fluoride or tetramethylammonium fluoride.

32. (Previously presented) A cleaning solution according to Claim 2, wherein the basic compound is a strong base having no metal ions.

33. (Previously presented) A cleaning solution according to Claim 32, wherein the strong base having no metal ions is tetramethylammonium hydroxide or trimethylhydroxyethylammonium hydroxide.

34. (Previously presented) A cleaning solution according to Claim 2, which further comprises a surfactant.

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35. (Previously presented) A cleaning solution according to Claim 34, wherein the surfactant is an anionic surfactant.

36. (Previously presented) A cleaning solution according to Claim 35, wherein the anionic surfactant is a phosphoric ester of a polyoxyethylenealkyl ether or a phosphoric ester of a polyoxyethylenealkyl aryl ether.

37. (Previously presented) A cleaning solution according to Claim 2, adapted for cleaning semiconductor substrates having metal wiring which comprises copper alone or a laminate structure of copper and a barrier metal.

38. (Previously presented) A cleaning solution according to Claim 15, adapted for cleaning semiconductor substrates having metal wiring which comprises copper alone or a laminate structure of copper and a barrier metal.

39. (Previously presented) A process for cleaning semiconductor substrates having metal wiring, which comprises cleaning with a cleaning solution described in Claim 2.

40. (Previously presented) A process for cleaning semiconductor substrates having metal wiring, which comprises cleaning with a cleaning solution described in Claim 15.

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41. (New) A cleaning solution according to Claim 1, wherein said ratio of an amount by weight of the acid to the amount by weight of the oxidizing agent is in a range of 1.0 to 100.

42. (New) A cleaning solution according to Claim 41, wherein said ratio is in a range of 1 to 60.

43. (New) A cleaning solution according to Claim 1, wherein amount of said fluorine compound in the solution is 0.001 to 15% by weight.

44. (New) A cleaning solution according to Claim 2, wherein said ratio of an amount by weight of the acid to the amount by weight of the oxidizing agent is in a range of 1.0 to 100.

45. (New) A cleaning solution according to Claim 44, wherein said ratio is in a range of 1 to 60.

46. (New) A cleaning solution according to Claim 2, wherein amount of said fluorine compound in the solution is 0.001 to 15% by weight.

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